

主筆 牧野富太郎

## 植物研究雜誌 第八卷 第四號

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## Ovule ノ胚珠ニ非ザル證據ヲ見ヨ

牧野富太郎

今日ノ人、悉クトハ言ハザルモ百人ノ内九十九人マデハ花中、子房 (Ovary) 内ノ Ovule ヲ胚珠ダト稱ヘテヲリ又書イテキル、私ハ元來其レハ大ナル誤デアツテ此 Ovule ハ斯ク譯スベキモノデハ無イ事ヲ數シバ切言シテ世ニ問フタ、ソシテ須ラク卵子ノ語ヲ以テ之レニ換ユベキ事ヲ世人ニ告ゲタ、是レハ取リモ直サズ圓イモノヲ圓イト言フベシ角イモノヲ角イト言フベシト云フニ均シク少シモ無理ノナイ德薄デアル、幸ニ世人ノ中ニハ私ノ此勸説ヲ容レテ賛意ヲ表セラレ、否ナ、其誣フベカラザル明白ナ事實ノ前ニ潔ギヨク之レヲ承認セラレタ方モアツタガ尙一般ニハヤハリ舊慣ヲ墨守シ其誤用ヲ敢テシテ恬然之レヲ省ミザル方ガ多イ、私ハ之レヲ見テ世人ハ何故ニ惡ヲ去テ善ニ移リ非ヲ避テ是ニ從フニ吝カデアアルカヲ慨カズンバアラズデアアル

從來毎々言ヒシ如ク Ovule ヲ胚珠ト定メシハ抑モ誰レデ又何時頃ニ其シナ事ヲ爲タノカト言フト是レハ明治六年ニ當時東京ノ博物局ニ在勤ノ小野職慤氏 (小野蘭山ノ後裔) ガ英國ノ植物學者 JOHN LINDLEY 氏ノ著ナル "School Botany" ヲ譯シテ "植學淺解" ト題スル一書ヲ編述シ今カラ五十八年前ノ紀元二千五百三十四年即チ明治七年ニ之レヲ當時ノ文部省デ刊行シタ時ニサウシタモノデ同書ニハ諸處ニ Ovule ヲ胚珠ニ充テ、書キ一種子ハ胚珠ノ成熟セルモノ"ナドノ語ガ見エテキル、又此書ヲ編スル時之レト關聯シテ同時ニ同氏ガ譯述シ明治七年五月ニ同ジク文部省デ發行シタモノニ "植學譯筌" 一冊ガアルガ此書中ニモ亦同様ニ Ovule ヲ胚珠ト定メテ

植物學

卷五

古

子房有與萼之本相粘附者、則在萼下、有不相粘附者、則

在萼上、此最

要事、可準之

分植物之類、



居中之胎座恆甚小、有漸大即爲果者、若楊梅之類是也、

如子、間有成小枝者、如丑、

卵在胎座內、後成種子、卵大率居子房之中、或有無子房

而露生者、得雄粉即成種子、如松實是也、故此類之花心、

受鬚粉最易、卵或有莖、或無莖、卵有胞、或一層、或二層、卵

『植物學』カラノ頁

舉ゲテアル

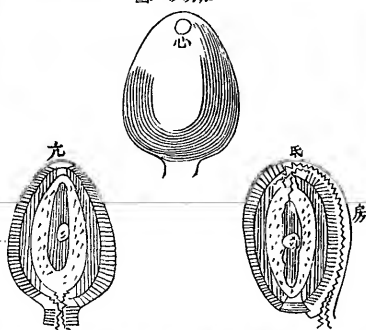
然レバ此胚珠ナル語ハ  
右小野氏ノ創メテ作ッ  
タ字面デアアルカト言フ  
ト決シテサウデハナイ  
即チ此レハ其源ヲ支那  
デ出來タ『植物學』ト題  
セル一書ニ發シテキル  
此『植物學』ハ漢文ノ一  
冊書デ書中ガ八卷ニ分  
レ前ノ七卷ハ支那ニ居  
タ英國人ノ韋廉臣氏ガ  
譯シテ支那人ノ李善蘭  
氏ガ筆述シ末ノ一卷ハ  
艾約瑟氏ガ續譯シテ同  
ジク李氏ガ筆述シ以テ  
一般植物學ヲ叙說シ今  
カラ七十五年前ノ咸豐  
七年ニ開雕シテ世ニ公

植物學

卷八

Ovule ノ 胚珠ニ非ザル證據ヲ見ヨ

圖大枚珠胚



内有胚珠一點、即異日果中之胚也、胚珠先生、胞後生、凡二層之胞、其二層必有相附連之處、

凡胚珠與二胞、其下相連者、則胚珠之末必與卵之末同方向、如亢、若胚珠之末與卵之末方向相反、則胚珠與胞相連之處必在上、如氏、此必有一螺旋體、令卵與胚珠相通、如房、胞之二層相連處有口、胚珠之上、面恆與口相通、故胚珠之下、與卵之下、恰相對、

五

同上

ニシタモノデアル、我邦デハ今カラ六十五年前ノ慶應三年ニ下野足利ノ求道館デ之レヲ翻刻シ發行シタノデ今日デモ往々坊間ノ書肆ニ之レヲ見受ケル、即チ此書ニ始メテ胚珠ノ名ガ出テキテ前ノ小野氏ハ此レカラ其レヲ取リ出シタモノデアアル然ルニ此時右小野氏ノ「ボタニー」ニ對シテノ知識ガ不充分デアッタト見エ能ク此書ノ意味ガ同氏ニハ會得ガ出來ナカッタラシク其胚珠ノ正體ガハツキリ判ラヌマ、ニ其邊ノ事ヲ取

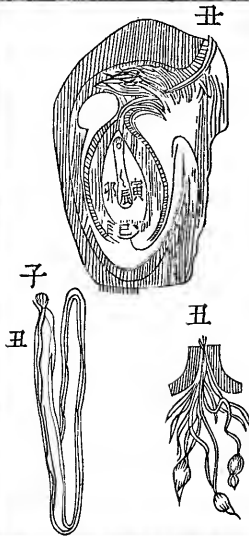
Ovule ノ胚珠ニ非ザル證據ヲ見ヨ

植物學

卷五

三

蓋口在卵之上、面也、亦有胚珠之上、恰對卵之下者、則口在卵之下、面、察口之處爲最要事、知此、卽知胚從何處生也、胚珠之中有細胞體、如心、胞體中有汁、胚生於汁中、孕胚之法、粉點飛至心口、中有細長管透出、或一或二或三不定、其管屈曲擠入心之聚胞體、刺入子房中、入卵之



口、遇胚珠、胚珠內細胞體中之汁動盪而孕胚、花孕胚時、以寒暑表測之、熱度加多、如圖、子爲

同上

扱ッタ爲メ元來胚珠ハ Ovule ノ中心體卽チ今日謂フ珠心ナル Nuc- lens (=Nucellus) ニ對スル譯語デアッタモノヲ Ovule (譯語ハ卵トアル) ノ譯語デアルト感違ヒシテ其處デ前記ノ通り Ovule ガ胚珠トナッタ譯デアッタ此勇敢ナル行爲ノ爲メニ其後ノ學者ハ皆此誤リヲ受ケ繼イデ今日ニ及ンデキル、疾クニ此いささつヲ知ツタ私ハドウモ此誤ヲ正サナクテハ學問ニ對スル良心ガ許サナイノデ爾來幾度カ聲ヲ勵マシ其匡正

粉、丑爲細長管、寅卯爲胚珠、辰爲細胞體、巳爲螺體之末

卵內有孕一胚者、有孕二胚者、有孕多胚者、

胚初孕、胚之生根處、能自行至口、胚先吸胚珠內之胚乳、

吸盡、乃吸子房內之胚乳、

本樹之粉、交本樹之花心、則生本類、若偶交他樹之花心、

則生變類、如松粉交柏之花心、則所生非松非柏也、凡變

類之葉略似父、而花略似母也、變類不傳種、而間亦有傳

種者、

粉囊裂時、卷而相交錯、多隙、故粉易出也、

直勿基

オム

上

Ovule ノ胚珠ニ非ザル證據ヲ見ヨ

同 上

ヲ高調シタガ尙飽キ足  
ラナイノデ今日モ尙其  
叫ビヲ續ケテキル  
此ニ面白イ事ガアル、  
今試ニ上ノ漢文ノ『植  
物學』ガ譯述セラレタ  
其原書ガ何ンデアッタ  
カラ釋ネテ見ル、其漢  
譯書ノ方ニハ書中ニ其  
原本ニ關シタ事ガ片鱗  
モ書イテナイノデ其邊  
ノ消息ガ能ク判ラナカ  
ッタガ私ハ偶然ニ其原  
書ガ JOHN LINDLEY 氏  
著ナン“The Elements  
of Botany”デアルコ  
トヲ知ッタ、然シ譯文  
ノ方ハ原本ノ全譯デハ  
ナク其重要ナル要處ヲ

### XVIII.—OF THE OVULE.

526. THE OVULE<sup>190</sup> is a body borne by the placenta (486), and destined to become a seed.

527. It is to the carpel (480) what marginal buds are to leaves (293), and to the central placenta what buds are to branches.

528. It may be regarded as a bud with a retrograde development.

529. The ovule is usually inclosed within an ovary (472); but in Conifers and Cycads it is destitute of any covering, and is exposed, naked, to the influence of the pollen.

530. It is either sessile, or attached by a little stalk called the *funiculus*, or *podosperm*. The point of union of the funiculus and ovule is the *base* of the latter, and the opposite extremity is its *apex*.

531. It consists of a sac, or of two sacs, one inclosed within the other, and of a *nucleus* within the sacs.

But M. Planchon has shown that the nucleus of *Veronica hederifolia* is destitute of sacs, being absolutely naked. See his excellent *Mémoire sur les vrais et les faux arilles*. 4to, Montpellier, 1844.

532. These sacs are called the *primine* and *secundine*.

The nucleus is first formed, then the secundine, and then the primine, as is shown by the figures at fig. 180. The nucleus would seem to be itself a growing point, and the sacs to be scales

formed round it analogous to the scales of a leaf-bud. In the bud itself the growing point comes first, necessarily; then succeed the scales.

533. The primine, secundine, and nucleus, are all connected with each other by a perfect continuity of tissue, at some point of their surface.

534. When the parts of the ovule undergo alteration of position during their growth, the two sacs and the nucleus are all connected at the base (530) of the ovule, which is *orthotropal* or *atropal*<sup>190 a 191 a</sup>.

535. And then the base of the nucleus and that of the ovule are in immediate connection with each other<sup>177 a</sup>.

536. But the relative position of the sacs and the base of the ovule are often entirely altered during the growth

of the latter, so that it frequently happens that the point of union of the sacs and the nucleus is at the apex (530) of the ovule<sup>190 c</sup>.

537. And then the base of the nucleus is at the apex of the ovule.

538. In such cases, a vascular connection is maintained between the base

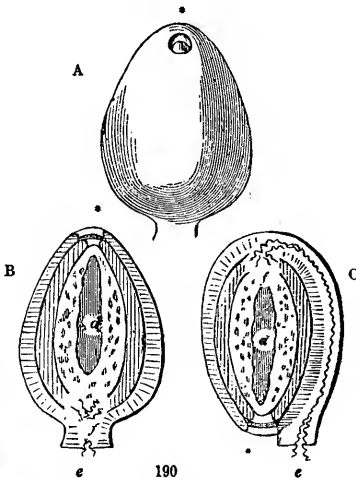


Fig. 190.—A An orthotropal ovule, highly magnified, showing the foramen; B a section of it; C a section of an anatropal ovule; • the foramen; f the chalaza; e the raphe; d the sac of the amnios.

## THE OVULE.

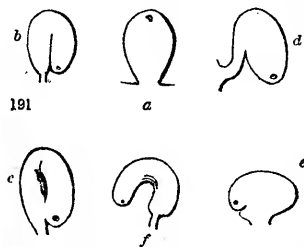
95

of the ovule and the base of the nucleus, by means of a bundle of vessels called a *raphe*<sup>190 e</sup>.

539. The normal position of this raphe is on the side of the ovule, next the placenta.

540. The expansion of the raphe, where it communicates with the base of the nucleus, gives rise to the part of the seed called the *chalaza* (642)<sup>190 f</sup>.

541. When the ovule is curved downwards so as to approach the placenta, it is *campylotropal*<sup>191 b</sup>; when curved downwards and grown to the lower half, *anatropal*<sup>190 e 191 c</sup>; when attached by its middle so that the foramen is at one end and the base at the other, it is *campylotropal* or *amphitropal*<sup>191 e</sup>; when horse-shoe shaped it is *lycotropal*<sup>191 f</sup>; when anatropal with the raphe half loose, it is *semianatropal*<sup>191 d</sup>.



542. The mouths of the primine and secundine usually contract into a small

aperture called the *foramen* of the ovule, or the *exostome*<sup>190 \*</sup>.

543. The apex of the nucleus is always applied to this foramen.

544. In consequence of the relation the base of the nucleus bears to the base of the ovule, the foramen will be at the apex of the ovule when the two bases correspond, and at the base of the ovule when the two bases are diametrically opposite.

545. The foramen indicates the future position of the radicle of the embryo; the radicle being usually next the foramen. This is a fact of great importance in practical Botany.

Gasparrini, however, asserts that, in the China orange, this is sometimes reversed: the radicle being turned to the chalaza.

546. Within the nucleus is a cavity or bag, called the *sac of the amnios*<sup>190 dd</sup>, containing a fluid, in which the embryo is developed.

The nucleus of some plants is pierced by the amniotic sac, which projects beyond the foramen as a tube, as in *Santalum*, *Narthecium* (557), &c. M. Planchon also found that in *Veronica hederæfolia* (531) the side of the naked nucleus is ruptured lengthwise by the amniotic sac, so as to become naked also. Something quite analogous occurs in *Avicennia*.

l. c.

抄譯シタモノデアル、今  
此處ニ其原本ト譯本トニ  
就テ上述胚珠問題ノ局部  
數頁ヲ摘載シテ世人ノ參  
考ニ供シ以テ其胚珠ガ元  
來 Ovule ノ名デハナク  
テ正ニ其 Ovule ノ中心  
體ナル珠心即チ Nucleus  
(= Nucellus) ノ譯語デ  
アル事實ヲ示シ、而シテ  
Ovule ハ謂ユル胚珠デハ  
ナクテ卵(卵子)ト云フノ  
ガ當然且正確デアル事ヲ  
モ明カニシテオク、即チ  
右掲出ノ數頁ハ其漢文ノ  
方ハ上ノ『植物學』カラノ  
轉寫デ其歐文ノ方ハ同ジ  
ク LINDLEY 氏カラノ複  
寫デアル、讀者ハ幸ニ之

HYBRIDS.

XIX.—OF FERTILISATION.

547. THE fertilisation of a flower appears to be accomplished by the action of pollen (452) upon the stigma (477).

The proofs of this are so many and so seemingly conclusive, that it is usual to regard the proposition as unassailable. But it is necessary to add that some facts are apparently irreconcilable with it. The chief of these is the case of a dioecious Spurgewort, allied to *Sapium*, and called *Cœlebogynne*, of which the female only is known. This plant produces ripe and *perfect* seeds in the Botanic Garden, Kew; and yet the most diligent search has failed to discover any polliniferous flowers. Is it fertilised by the pollen of some other plant? This seems improbable, because the seedlings are exactly like their mother, which is not the case with vegetable hybrids (551). Certain experiments instituted by M. Girou de Buzareingues have led him to the conclusion, that in Hemp, the *Lychnis dioica*, and other dioecious plants, the presence of pollen is not necessary to fertilise the ovule (*Ann. Sc.*, 1st ser., xxx. 406). And it appears certain that in some instances Cucumbers have swelled fruit, and ripened seeds, in the absence of pollen. Finally, we have the assurance of Decaisne, that in *Viscum* the ovule is not formed till six weeks or two months after the pollen has acted on the stigma; and Professor Gasparrini maintains that in the Fig-tree the embryo is formed without any fertilisation whatever; for the summer crop of this fruit is obtained from female flowers, which can by no possibility communicate with stamens, the male flowers not being produced at that time, and nevertheless it abounds in seeds containing the embryo; while, on the other hand, the spring figs, in which male flowers do occur, never have any embryo in their seeds! The female Hop is fertile without a male. (*See Ann. Sc.*, 3rd ser., v. 306.)

548. The result of that action seems to be the formation of an embryo (650) within the nucleus of the ovule.

549. When the pollen and stigma each belong to the same species, then that species is propagated without material alteration.

550. But if they belong to different species, then their mutual action results in the production of *hybrids*, or vegetable mules.

This is not an artificial process, but happens frequently in wild nature, and is yearly giving rise to the false species of botanists.

551. A hybrid is not necessarily sterile, but is often capable of propagating its race.

552. It is usual for the hybrid to resemble the male parent most in foliage, and the female in flower.

This has been proved to be the general rule by the numerous experiments of the Dean of Manchester. See Dr. Herbert's papers in the second volume of the *Journal of the Horticultural Society*.

553. The expulsion of pollen from the anther is due to the contraction of its valves. It is naturally effected in dry, warm weather; and cannot take place in the presence of wet, except in species whose fertilisation is effected under water.

It is not improbable that, as De Buzareingues has suggested, the noxious effect of wet upon fertilisation may consist partly in preventing the anther-cells from opening, and partly in the activity which it gives to the vegetation of the stem.

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## POLLEN-TUBES.

97

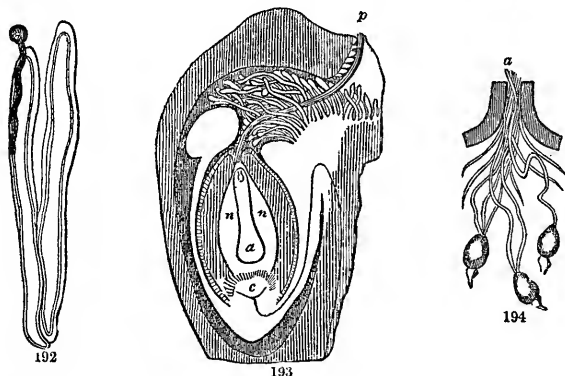
554. The pollen is enabled to act upon the ovule by means of an extension of its inner lining, if it has more than one coat (454), in the form of a tube or tubes.

555. The *pollen-tube* insinuates itself between the cells of the stigma<sup>192</sup>, and passes down its conducting tissue till it reaches the interior of the ovary.

556. Having reached the interior, a similar tube appears, and connects the apex of the nucleus of the ovule, through the foramen, with the conducting tissue of the style<sup>193 194</sup>.

557. The result of this action is the formation of a living point which eventually becomes the embryo.

In the present state of knowledge as to this point, the above seems to be the safest way of stating facts. The common opinion among botanists is, that the pollen-tubes pass directly to the nucleus, through the foramen. There is no question that pollen-tubes of great length grow out of the pollen-grains, and plunge into the stigma. The curious phenomena connected with Asclepiads, and more especially with *Morrenia*, in which great mechanical difficulties are overcome by the pollen-tubes before they can reach the stigma, prove that this phenomenon is connected with vitality of a very high order. Neither is there room for doubting whether *similar* tubes appear in the cavity of the ovary, connecting the conducting tissue of the style with the apertures of the ovules (see figs. 193 and 194).



But it may be reasonably questioned whether the tubes are the same in both cases. Not that there is any difficulty in understanding how so great and rapid a growth on the part of the pollen-tubes as is assumed should take place; for the starch of the foveola (453) may be regarded as a store of organizable matter provided for this express purpose, as Brown suggested. The doubt arises from the impossibility in many cases of so tracing the small delicate transparent threads as to be certain that they do not become blended with long cells having a different origin, and that it is not the latter which are seen in the cavity of the ovary. It is asserted, indeed, that these tubes have been distinctly traced *ab origine*; and no doubt can be entertained that observers have thought so. The question is, may they not have been deceived? Dr. Dickie, positively asserts that in *Narthecium* the so-called pollen-tubes in the interior of the ovary are really ovule-tubes, or delicate filaments, rising from the apex of the nucleus, and ad-

Fig. 192.—A grain of pollen sending its pollen-tube down among the stigmatic cells of Papaver.—*Möhl*.  
Fig. 193.—A longitudinal section of the carpel of *Euphorbia pallida* at the time when the pollen-tube *p* has reached the apex of the nucleus *n n*. It appears as a dark streak passing through the filamentary conducting tissue of the style; *a* is the sac of the amnios, and *c* the chalaza.—*Schleiden*.

Fig. 194.—A longitudinal section of the interior of the ovary of a *Helianthemum*, with the pollen-tubes descending from *s*, and reaching the foramina of the ovules which are forcibly detached from their placenta.—*Schleiden*.

## 舊軒獨語(其四十五)

レヲ對照シテ讀マレタナラバ私ノ主張ガ決シテ根據ノナイヨイ加減ナ架空ノモノデハナク乃チサウ言フノガ尤モダト首肯シテ下サルデアラウト確信シテ疑ハヌノデアアル  
 己ニ此ノ如ク其錯誤ガ明白ニナツタ事ヲ知り得タ人々ガ尙從來ノ形式ニ拘泥シ其濫用誤認ヲ改ムル事ヲ敢テシナケレバ其人ハ臆病デ勇氣ノ無イ事ト且亦學問ニ對スル態度ノ煮切レナイヲ世人ニ嗤ハル、事デアラウ、又之レヲ改ムル一時ノ不便ト此誤謬ヲ傳ヘテノ千載ノ悔トハ其得失識者ヲ俟テ後ニ知ルベキ問題デハナカラウ

## ○舊軒獨語(其四十五)

舊軒朝比奈泰彦

## ○邦産バルメリア屬中ヒボギムニア Hypogymnia 及メネガッチア Menegazzia ノ兩亞屬ノ種類

此兩亞屬ノ地衣ハ舊時ハ何レカノ名稱デ合併シテアツタ、例ヘン NYLANDER (Flora, 1881, s. 537) ハ Hypogymnia ヲ設ケ WAINIO (Etud. Lich. Brésil. I. [1890]) ハ Menegazzia (Mass.) ヲ採用シ HUE (Lichenes Extra-Europaei) モ之ニ從テ居ル、コレモ一理アルンデ此兩屬ノ地衣ハ他ノ真正バルメリア Euparmelia 亞屬ノモノト異リ裏面ガ全ク裸出シ毛茸ヤ毛根ヲ有シテ居ナイ、ソシテ葉體ガ比較的細ク紐狀ヲナシテ居ルカラデアアル、BRETHER (Hedwigia, 1901, s. 171) ハ Menegazzia ヲ其屬ノ創設者タル MASSALONGO ニ同意シテバルメリアカラ分離シテシマッタノデアアルガ其後 ZAHLEBRUCKNER (Phanzen-Familien, I. Abt. I [1907]) ハ之ヲバルメリアノ亞屬トシタ、今此兩者ヲ ZAHLEBRUCKNER ニ從テ分ツト左ノ通りデアアル

ヒボギムニア Hypogymnia 亞屬

メネガッチア Menegazzia 亞屬

地衣體ハ通常狹ク、分枝シ裏面ハ裸出シ僅ニ吸盤様

地衣體ハ同上

ノ點ニテ基物ニ着生ス